

**Claims:**

What is claimed is:

- 5     1.     Apparatus for converting an optical signal to a digital signal comprising:  
          a photodiode converting an optical signal to a current;  
          a transimpedance amplifier converting the photodiode current to a voltage,  
          a sawtooth generator producing a sawtooth wave, and  
          a comparator comparing the sawtooth wave with the voltage output of the  
10    transimpedance amplifier, producing a pulse width modulated digital output.
2.     The apparatus of Claim 1 where the sawtooth generator also includes a  
          synchronization input.
- 15    3.     The apparatus of Claim 1 where the transimpedance amplifier, sawtooth  
          generator, and comparator are in a common package.
4.     The apparatus of Claim 1 where the photodiode, transimpedance amplifier,  
          sawtooth generator, and comparator are in a common package.
- 20    5.     The apparatus of Claim 2 where the photodiode further includes an optical  
          filter.
6.     The apparatus of Claim 5 wherein a plurality of converter units, each  
25    converter unit comprising a photodiode with an optical filter, transimpedance  
          amplifier, and comparator, are driven by a common sawtooth generator.
7.     The apparatus of Claim 6 where the plurality of converter units are driven by a  
          sawtooth generator internal to one of the converter units.
- 30    8.     The apparatus of Claim 6 where the plurality of converter units are driven by a  
          sawtooth generator external to all of the converter units.

9. The apparatus of Claim 5 wherein a plurality of converter units, each converter unit comprising a photodiode with an optical filter, transimpedance amplifier, comparator, and sawtooth generator, are synchronized.

5 10. A method of converting an optical signal to a digital signal comprising:  
converting the optical signal to a current,  
converting the current representing the optical signal to a voltage representing  
the optical signal,  
generating a sawtooth wave, and  
10 comparing the sawtooth wave to the voltage representing the optical signal  
and producing a digital pulse width modulated output.

11. The method of Claim 10 where the sawtooth wave is synchronized to an external signal.

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12. The method of Claim 10 further including the step of filtering the optical signal.